

Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Systematic measurement of the optical potential for the alpha elastic scattering RYO SAWADA, TAKAHIRO KAWABATA, Department of Physics, Kyoto University, KADAIKENKYU-P4 COLLABORATION — Alpha inelastic scattering is one of the most widely used probes to measure the isoscalar excitation strengths in atomic nuclei. Very recently, the alpha inelastic scattering from self-conjugate $N = Z$ nuclei at $E_\alpha = 130$ MeV were measured. In the recent work, the optical potentials for the elastic scattering were used in the DWBA analysis. The optical potentials were determined so as to reproduce the differential cross sections for the elastic scattering. However, the optical potentials were not uniquely determined because the experimental data of the elastic scattering was limited to the forward angles of $\theta_{lab} < 30^\circ$. Therefore, the systematic uncertainties due to the ambiguities in the optical potentials still remain in the deduced excitation strengths. In the present work, the differential cross sections for the elastic scattering at the backward angles ($\theta_{lab} = 30 - 45^\circ$) were measured in order to uniquely determine the optical potentials by using a 130-MeV α beam accelerated by AVF cyclotron at RCNP, Osaka. As the result, we succeeded in the unique determination of the optical potentials. These potentials are useful to reduce the systematic uncertainties in the isoscalar excitation strengths measured by alpha inelastic scattering.

Ryo Sawada
Department of Physics, Kyoto University

Date submitted: 30 Jun 2014

Electronic form version 1.4